THE DIRECTOR'S REPORT

The Arnold Arboretum During the Fiscal Year Ended June 30, 1968

An unusual early and temperate spring season produced a spectacular flowering display, and the living collections were particularly beautiful, drawing larger numbers of visitors than have been seen in the experience of the current staff. Spring, 1968, can be considered one of those rare and enjoyable spring seasons in New England which permit the public to enjoy the grounds to their fullest and the staff to make observations through long periods of flowering. The lilacs, for example, were at their best for two weeks from May 12 to 25, while last year the short and belated display period occurred between June 3 and 10. In contrast was the unexplained severity of winter damage to many plants in the nursery areas. Severe losses of young plants occurred in January when a normally adequate snow cover was on the ground. The same pattern was also seen in commercial nurseries and on private grounds throughout the northeastern part of the United States, with the most severe losses of plant materials occurring in areas on Cape Cod.

An item of major construction completed during the year was the new garage and storage building for mechanical equipment used on the grounds. Ever since the construction of the herbarium addition to the Administration Building in 1905, mechanical equipment and tools had been kept in the basement, with access through a narrow ramp. Although in earlier days the grass in the Arboretum was permitted to mature and was, in fact, cut by scythe and stacked in mounds, in recent years mowing has been a continuous operation through the growing season, and the cut grass has been retained as a mulch. The tractor-drawn mowers and similar power devices to cut grass or to care for the living collections fitted like pieces of a jig-saw puzzle in the basement. With funds accumulated from the bequest of Martha Dana Mercer a new garage was planned and constructed and was officially accepted on March 1, 1968. Built into a bank area, the one-story structure, 44 by 105 feet, is of reinforced concrete faced with brick. Adequate storage at ground level for all vehicles and grounds equipment is supplemented with special storage rooms for parts, tools, fertilizers, and sprays. Four electrically operated overhead metal doors permit easier access. The $145,000 budget for this building included a grease pit, overhead lift, 1000-gallon gasoline storage tank, and additional essential equipment, such as a hydraulic press, steam cleaner, air compressor, electric welder, and electric grinder. A paved parking area for twenty-one staff cars removes them from the front of the administration building and permits easier parking for visitors. The whole

The newly completed garage and vehicle-servicing facility constructed adjacent to the Administration Building. Climbing plants have been planted along the end walls of the building and near the fence and these will soon soften the lines of the addition.

garage area is enclosed by a chain-link fence topped by barbed wire. Nineteen different kinds of climbing plants have been started near the garage and along the fence to beautify the area.

Staff:

Again this year the Arboretum staff lost by death one of its valuable members. Dr. George Konstantin Brizicky died on June 15, 1968, after a heart attack. Dr. Brizicky joined the staff in 1960, initially on a joint appointment with the Gray Herbarium, and worked with Dr. Wood as a botanist on the *Generic Flora of the Southeastern United States.* His careful bibliographic and taxonomic work is exemplified in more than 80 scientific papers. His unusual career will be reviewed in a biographical sketch planned for a later issue of the Journal.

Two staff members retired at the end of the year: Mrs. Margaret C. Lefavour, as herbarium secretary, and Mr. Henry Draper, as superintendent of the Case Estates in Weston. New appointees will take their places, but it will be difficult to equal their loyal contributions to the development of the Arboretum during the years they have served on the staff.

Resignations were received from Mr. Andrey Baranov, Herbarium Assistant, who will do botanical consulting, and Dr. Harrison Flint, Associate Horticulturist, who will join the faculty of the Department of Horticulture of Purdue University.

New appointments to the staff included Dr. Paul Davidsen Sorensen,

as Assistant Horticultural Taxonomist, and Mr. George Howard Pride as Associate Horticulturist. Dr. Beryl Simpson Vuilleumier was appointed as Botanist on the Flora of the Southeastern United States project. Mr. Thomas Matthew Kinahan, of the Arboretum grounds staff, was promoted to be Superintendent of the Case Estates.

The members of the staff serve the broad fields of systematic botany and horticulture in many ways, both nationally and internationally. These are often through various committees, and new assignments accepted during the year include the appointment of Dr. DeWolf to an advisory panel of the National Science Foundation; Mr. Fordham as chairman of the International Plant Propagators Society's committee to evaluate woody plant cultivars; Dr. Howard as chairman of the Plant Records Center Committee of the American Horticultural Society; Mr. Pride to the Garden and Grounds committee of Old Sturbridge Village; and Dr. Wyman to the Board of Directors of the Roxbury-Dorchester Beautification Project.

Dr. Howard was elected an honorary foreign member of the Royal Danish Academy of Science and Letters and the Honorary President-at-large of the Herb Society of America. He also received the distinguished citizen citation for 1968 issued by the Metropolitan Area Association of Warren, Ohio.

Horticulture:

The activities of the staff in the field of horticulture involve the maintenance and care of the living collections of woody plants; work in plant

The several planted terraces for genetic dwarf conifers below the slat house holding the *bonsai* collection. The Dana greenhouses appear in the background.

propagation; and the operation of nursery areas and display plantings established at the Case Estates in Weston.

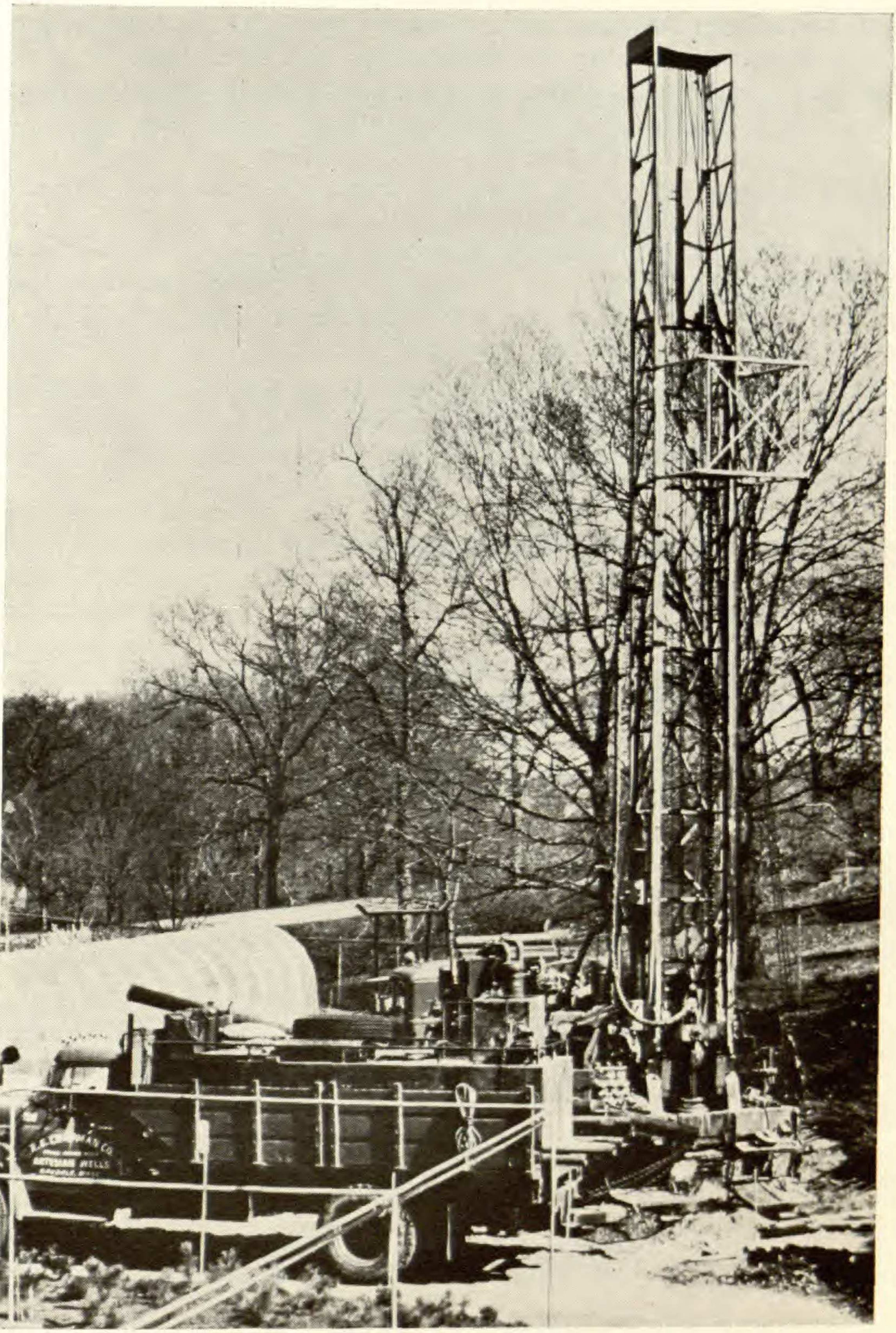
In Jamaica Plain, work continued on the old road bed along Centre Street recently acquired from the City of Boston. The road surfacing material was removed and replaced with soil and mulching materials. Grass was sown and some coniferous species planted. This area, although small, will permit an expansion of the pinetum and the development of attractive plantings of crab apples visible from the heavily travelled U.S. Route 1.

With construction of the new garage adjacent to the administration building, new entrances were constructed to the basement and to the first floor of the herbarium, the latter in association with a loading platform which will facilitate delivery of supplies. The ugly ramp to the basement was replaced with a bulkhead. The lawn in front of the building, which was ruined by the installation of water pipes and by the construction equipment, was completely renovated; it will soon look better than before.

The collection of genetic dwarf conifers was enlarged by the addition of 177 taxa planted on two additional levels of the terraces below the *bonsai* house. Around the nursery, the collection of ground cover plants especially suited for bank planting was increased by 24 taxa. During the fall and spring 375 taxa were added to the general collections of living plants.

Shortages of water during past years have had accompanying city restrictions on the outdoor use of water, even in our nursery areas. To counter this problem a well 115 feet deep was drilled this spring, with the pleasing result of a supply of 50 gallons per minute. This quantity will be sufficient to supply five sprinklers in the greenhouse area through the use of an electric pump and will be adequate for greenhouse and nursery needs during periods of future restrictions on city water. A new overhead irrigation sprinkler system was also installed by the staff for the nursery area. Included in the system is an automatic timing device permitting a sequence of watering in various areas and an intake system so liquid fertilizers can be applied through the water flow.

The work of the greenhouse staff includes a consideration of needed additions to our collections through seeds and the propagation of plants on the grounds needing replacements. During the year 401 taxa were propagated to prepare replacements for specimens which appeared to be failing or which were insufficiently represented within our collections. One hundred fifty-five shipments of plant materials, comprising 649 taxa, were received from the United States and nine other countries. Seeds of 339 taxa either for germination and addition to the collections, or for experimental studies in germination, or for staff research were included in 86 shipments from the United States and 25 other countries. Requests for materials, seeds, or propagating material from our collection were filled when possible. Although material which can be procured from commercial sources is rarely distributed in response to nonprofessional requests, legiti-



The well drilling operation adjacent to the greenhouses struck water at less than 100 feet. A flow of 50 gallons per minute will solve some watering problems in the nursery area.

mate requests for documented material are honored, and during the year 214 shipments of plant materials comprising 1146 taxa were sent to coöperating scientific institutions or nurseries or for individual research projects in 17 countries.

The program of distribution in a plant hardiness test begun last year by Dr. Flint was expanded this year with the coöperation of Mr. Fordham and the plant propagation staff. Twenty-five coöperating stations from western Massachusetts to Presque Isle, Maine, and areas in northern New Hampshire and Vermont were selected, and more than 1500 container-grown woody plants of 41 taxa were distributed. Uniform methods of culture have been suggested for these plants, as well as systematic observations which can be correlated to increase our knowledge of hardiness of species and of the nature of winter damage.

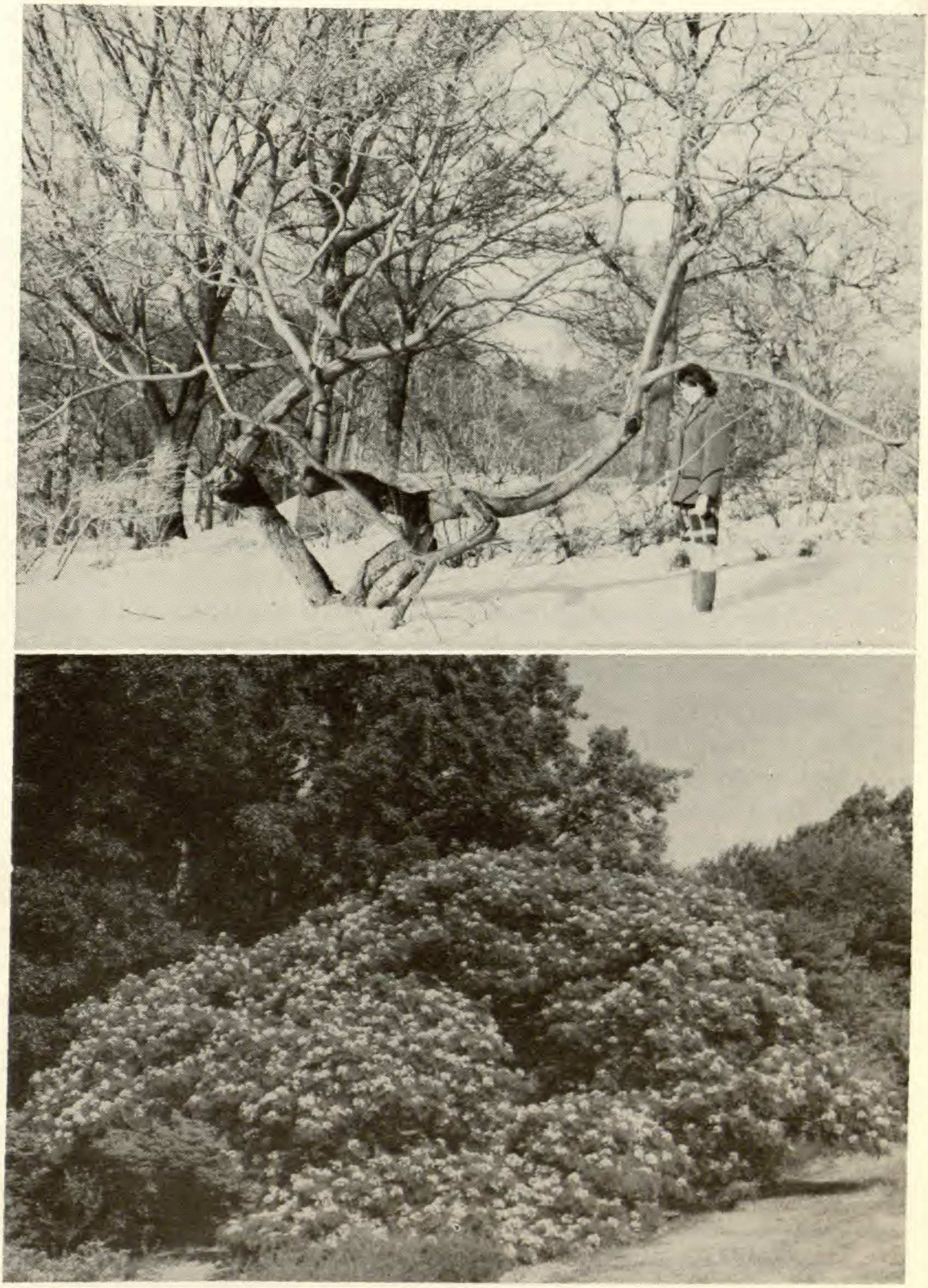
Surplus plants from the Arboretum nursery areas were given as usual to the Department of Buildings and Grounds at Harvard and to neighboring institutions in adjoining states. These materials correctly identified and properly labelled and documented increase the value of campus plantings as teaching aids to departments of botany and horticulture. We have also coöperated with the City of Boston in programs for beautification of depressed areas. Two truck loads of plants were given to the Roxbury-Dorchester Beautification Project, and over one thousand rhizomes of surplus *Iris* were made available for distribution.

Activity in the registration of new cultivars of woody plants continued during the year. A registration list of cultivars in *Lantana* is nearing completion, and progress is being made on one for *Philadelphus*. An issue of *Arnoldia* was devoted to the publication of new names submitted for registration. From our own collections *Albizia julibrissin* cultivar ERNEST WILSON, introduced from Korea by E. H. Wilson in 1918 and now considered to be sufficiently distinctive to merit formal recognition, was described.

The staff is also coöperating with a national committee in re-evaluating the species and cultivars of lilacs grown in the United States. After a three-year study the committee plans to reissue its analysis of "Lilacs for America," which was first published in 1953.

A mail survey of American colleges was conducted to determine the number of campus floras and the frequency of their documentation. Local lists prepared by taxonomists and properly documented by herbarium specimens can be used for information on the distribution and hardiness of cultivated taxa with greater reliability than can data obtained from nursery catalogues.

The staff is also coöperating with the American Horticultural Society in the establishment of a Plant Records Center. Dr. Howard serves as chairman of a committee which will coördinate the gathering of information on the holdings of various botanical gardens and arboreta. An ultimate goal is a data processing system permitting quick recovery of information on the source and location of important plant materials. No up-to-date system for the location of particular plants needed for scien-



Albizia julibrissin 'Ernest Wilson', a new cultivar status for an old tree. The hardiness in the New England climate and the spreading habit distinguish this selection from the more southern plants.

tific studies exists today. A grant to the American Horticultural Society from the Longwood Foundation will initiate this work. Administrative procedures are being worked out at the present time, with compilation of information to begin as soon as possible.

A program of collecting herbarium specimens from plants in the Arboretum collections which are the sources of type material is under way. Although such specimens exist in our own herbarium, the increased interest on the part of others in vouchers and the possibility of obtaining equally valuable material from other institutions makes this a project of particular value. When the size of the plant permits, twenty specimens are collected for future exchanges.

The research program of Dr. Owen Rogers, of the University of New Hampshire, as a Mercer Fellow during the past year is of special interest. His work during the spring involved controlled crosses of many taxa of *Syringa* using plants in the living collections and those from his plots in New Hampshire. Time is required for an analysis or evaluation of the seeds obtained and seedlings developed. It is of interest to record that, although many seeds were obtained from crosses of *Syringa velutina* and *S. meyeri*, only albino seedlings developed, a result similar to that obtained earlier by Karl Sax from crosses involving *Syringa pubescens*.

Case Estates:

The Case Estates, comprising 110 acres of land in the town of Weston, serve both as the nursery area for the Arboretum and for display plantings open to the public. The land also provides room for specimens which cannot be accommodated in the plantings in Jamaica Plain.

A generous gift of 575 *Rhododendron* seedlings and over 100 rooted cuttings of cultivars of *Ilex* was made by Mr. Josiah K. Lilly, III, of Sandwich, the owner of the Dexter Estate. These plants will be grown to larger size, tested for hardiness, and evaluated at the Case Estates.

Through the efforts of Mr. George Pride and members of the New England Wild Flower Society a collection of wild flowers also is being developed. Since the natural areas of the Case Estates are used by the public schools of Weston and are visited by many interested organizations, a small collection of wild flowers will enhance the educational value of this area.

The extensive collection of crab apples planted on the Newton Street tract flowered profusely this year, drawing the attention of commuters and visitors. An additional roadside planting on Wellesley street of 32 varieties of *Rhododendron* will add to the attractiveness of this land in the center of Weston.

Herbarium:

The problem of adequate space continues in the herbarium of spontaneous plants housed in Cambridge. The University is coöperating in a study of means of obtaining increased space either by the addition of a fifth floor to the present building or by the addition of a wing. Studies of space

needs for laboratories, staff offices, and herbarium storage, and methods of financing construction are ahead.

A total of 31,750 specimens was mounted during the year and added to the herbarium, bringing the holdings to 881,730, of which 132,750 specimens are housed in Jamaica Plain and are from plants in cultivation.

These additions are from collections on hand from past years, and only in small part from those received during the current one. During 1967–1968, 13,234 specimens were received in exchange, 562 as gifts, 4,886 from the subsidy of expeditions, 4,118 from staff collections and 1,363 in exchange for identifications. These ranked in order of magnitude from Papuasia, the West Indies, Africa, Mexico and Central America, Western Malaysia, and the United States, with lesser numbers from the rest of the world. Our holdings from Africa are inadequate for reference and teaching purposes, and we value the coöperation of colleagues in Berlin and South Africa who have supplied selected African material. A total of 8,867 specimens was sent as exchange, with 112 additional ones sent for identification or as special gifts.

The combined herbaria of the Arnold Arboretum and the Gray Herbarium sent 18,050 specimens on loan for scientific studies. There were 168 loans to 84 institutions, 54 in the United States and 30 in 16 other countries, For our staff and students we borrowed 13,139 specimens in 80 loans from 35 institutions, 29 in the New World and 5 in the Old.

Herbarium specimens are borrowed for monographic studies or to aid floristic work. These represent the primary scientific studies of the systematic botanists on the Arboretum staff which are possible only with the use of a major herbarium and its supporting library. The resident staff and some of the Mercer Fellows have the advantage of these important collections in their work. Our materials are also consulted by numerous visiting scholars. Unfortunately, working space for these scientists is minimal, and additional work space and housing area for specimens and books must be provided in the very near future.

Although the published bibliography indicates the completed scientific contribution much significant work is in progress. The Southeastern Flora project under the supervision of Dr. Carroll Wood is financed by a grant from the National Science Foundation. Dr. Beryl Vuilleumier and the late Dr. George Brizicky have coöperated with him in the studies of plant families in this flora. Visiting collaborators appointed as Mercer Research Fellows during the past year have included Dr. John Thieret, of the University of Southwestern Louisiana, working on the Scrophulariaceae and Orobanchaceae; Dr. Robert Long, of the University of South Florida, the Acanthaceae; and Sister Mary Victoria Hayden, of Catherine Spalding College, genera of the Rubiaceae. An important paper on the genera of the Euphorbiaceae by Dr. Grady L. Webster, University of California, Davis, was published in the *Journal of the Arnold Arboretum*. Reflecting Dr. Webster's long-standing interest in this complex family, this account deals with many problems far beyond the geographic borders of the *Generic Flora*. Ten additional families are currently under study,

by various botanists. Mention should also be made of the work of the artists associated with this project. Mrs. Sydney B. DeVore, who replaced Miss Rachel A. Wheeler during the year, is continuing the critical illustrations of genera. Each illustration is based on living or recently preserved material and represents an original study. Many genera are being illustrated for the first time. Errors in fact and interpretation which have been long perpetuated are revealed and corrected in the course of the art work. Detailed illustrations have been prepared for 205 genera of 105 families.

The staff wishes to express a special word of appreciation for the work of Dr. George Brizicky who died during the year. His fluency in Slavic languages was a particular asset to the project, for he was most generous with his time and assistance. At the time of his death Dr. Brizicky was working on the genera of the Malvaceae, and he had completed a manuscript on the general problem of subgeneric and sectional names, their starting points and early sources, subjects which had interested him for a number of years.

Dr. Thomas Hartley has continued his work in the identification of personal collections of plants made in Papua and New Guinea between 1961 and 1965. The 3700 numbers represent one of the largest recent collections from the area, and they are specially significant in supporting phytochemical studies. The final study will be a check list published in collaboration with chemists of the Commonwealth Scientific and Industrial Research Organization in Melbourne, Australia, documenting the chemical analyses which came from field and laboratory studies. Dr. Hartley's monographic studies in the family Rutaceae are continuing with an investigation of the genus *Flindersia*.

Dr. Howard completed the field studies of an elfin forest on the top of Pico del Oeste, in the Luquillo Mountains of eastern Puerto Rico. This project, supported by a grant from the National Science Foundation, was an ecological study of a peculiar environment and forest type. The collaboration of many scientists from other institutions made possible studies on the weather, soils, and root and anatomical characteristics of the vascular plants, as well as on the non-vascular plants. The study documents the unusually high and persistent humidity associated with a nearly continuous cloud cover and places greater significance on the air-borne moisture of clouds than on the prevailing winds. Studies of composition of the forest compared the frequency of species with the occupancy of the canopy surface and revealed that species infrequent in number in the total flora dominated the canopy. The unusual habits of constituent plants included the development of prop roots, as well as branched and unbranched aërial roots, the high frequency of long-shoot–short-shoot growth patterns, and a candelabra branching system, all of which contribute to the contorted stem structure and low growth aspect of the elfin forest. Since liverworts proved to be more abundant than mosses, the commonly used term "mossy forest" is a misnomer for this area. Algal studies by a collaborator showed an unexpectedly high number of species, not only on

the ground, but on the trunks of the trees, in the gelatinous sheaths of adventitious roots, and in the liquid held by epiphytic bromeliads.

Chemical studies showed a low percentage of plants with alkaloids and related chemicals but an unexpectedly high number of plants containing chemicals showing biological activity in relation to animal tumors. The results of the study will be published in subsequent issues of this Journal.

Dr. Hu spent four months in the territory of Hong Kong developing her studies of the flora of that area. Her field work has greatly increased the collections of specimens including plants under cultivation in Hong Kong in our herbarium. The courtesies extended to her by the staffs of Chung Chi College and the Herbarium of the Urban Council and Urban Services Department, Hong Kong, are greatly appreciated.

Dr. Nevling, representing the staffs of both the Arnold Arboretum and Gray Herbarium, is participating actively in investigations on the vegetation of the state of Veracruz with Dr. Arturo Gómez-Pompa and members of the Instituto de Biología, Universidad Nacional Autónoma de México. Two field trips during the year permitted quick surveys and selected collecting of native and cultivated plants. The staff of the Instituto de Biología is continuing collecting efforts subsidized in part by the Arboretum. Dr. Nevling is assisting in the identification of specimens and in research necessarily based at Harvard's more complete libraries. This study continues the traditional interest of Harvard's botanists in the flora of Mexico. Dr. Nevling's monographic interests continue in the family Thymelaeaceae.

Dr. DeWolf and Mr. David Hall, a Mercer Fellow, are collaborating on a study of the genus *Ficus* in Venezuela for a national Flora of that country being prepared by the staff of the Instituto Botánico in Caracas. A similar treatment of *Ficus* in Suriname prepared by Dr. DeWolf will be published by the State University of Utrecht, Netherlands. Detailed studies of the misunderstood *Ficus dicranostyla*, a species of western and central Africa, have shown that this belongs to a small group of species the nearest member of which is restricted to a small area of northern Madagascar. This is an unusual distribution pattern for species of *Ficus*, but is another example of the phytogeographic patterns previously reported for other genera.

Dr. Schubert has worked towards completing floristic treatments for *Desmodium* and *Dioscorea*. Requests for accounts of *Desmodium* in the Galapagos islands, Texas, Panamá, and tropical East Africa are all associated with floras in preparation at other institutions. Her field work in Mexico has permitted a special investigation of several small-statured species of *Dioscorea* which have not been adequately represented by herbarium material.

Dr. Sorensen has continued his broadly based study on the genus *Dahlia* and is currently tracing the introduction of species into cultivation and their subsequent selection and breeding. Cytological work on plants grown at the Arnold Arboretum has yielded original chromosome counts for 16 species and hybrids. Coöperative phytochemical and ana-

tomical studies of *Dahlia* materials are being undertaken by scientists from the University of California and the University of Massachusetts.

Miss Powell, in coöperation with Dr. Howard, has undertaken special historical studies of plant introductions to and from the West Indies. With the collaboration of Mrs. Brigid Sturrock, resident in St. Lucia, a renewed study of the plants of that island is under way. Studies of the phenology of plants from St. Lucia can be correlated with ecological studies based in Puerto Rico and St. Kitts.

Each of these staff projects demonstrates the unique contribution possible from a major herbarium and library of world wide concern.

Library:

The problem of available space for growth of collections referred to in connection with the herbarium is also of concern within the library. Studies for an addition to the Harvard University Herbaria building in Cambridge will involve the nature of growth and the increased use of the library collections. Currently, 90 per cent of the available shelf space is filled, which is beyond the recommended maximum of 70 to 85 per cent, the remaining unoccupied space being needed to avoid unnecessary shifting of books.

The library of the Arnold Arboretum grew by the addition of 491 volumes and 219 pamphlets and reprints to totals of 54,267 and 21,098, respectively, or a total holding of bound books and periodicals and unbound reprints and pamphlets of 75,365.

The regularly issued additions of the Gray Herbarium Index, the Index Nominum Genericorum, and the Torrey Index were filed. Thirty-six hundred sixty new catalog cards were added during the year, and the Rehder Index of important information on cultivated plants maintained in Jamaica Plain received an additional 625 cards. Until the end of last year reports of our holdings as duplicates of catalogue cards were sent to the National Union Catalog at the Library of Congress and to Widener's Union Catalog at Harvard. Now an additional record will be sent to the new undergraduate science library at Harvard, which will also hold general card indices.

Miss Sutton continues her work on the biography of Charles Sargent and on the cataloguing of manuscripts and letters of historical interest at the Arnold Arboretum.

During the year an inventory was made of the publications of the Arboretum, including the accumulations of reprints of articles by former staff members. The reprints were arranged in sets, and a list of these and available publications was prepared and distributed to libraries and members of the American Society of Plant Taxonomists. The collections of reprints offered at cost were quickly sold and the number of publications on hand significantly reduced, not only making the volumes available to interested persons, but freeing useful space.

Comparative Morphology:

The wood collection received normal curatorial care during the year.

Additional specimens of wood and slides were received, including sets of prepared slides associated with Project 1, School of Forest Resources of the North Carolina State University, a study of the woods of the United States. Requests for wood samples or for the loan of slides were handled when possible. Active use of the collections involved the work of Dr. William Theobald and Mrs. Helen Roca-Garcia in investigations on the woods, stems, and leaves of plants of the dwarfed forest on Pico del Oeste, Puerto Rico, while Dr. Alfred Linn Bogle continued his studies of the Hamamelidaceae and allied families.

Education:

No formal courses were taught in the Department of Biology by members of the Arboretum staff during the year, but active instruction to graduate students and participation in seminar programs continued as usual. Dr. Schubert conducted the seminar program in systematic botany during the fall term. Dr. Hartley again offered the Harvard University Extension Commission course in general botany.

Field courses were offered to Friends of the Arboretum during the fall by Dr. Wyman and by Mr. Pride, in Jamaica Plain and Weston, respectively. Mr. Fordham offered a discussion of methods of collecting and treating seeds of woody plants. During the winter a series of lectures on Caribbean botany was given at the Case Estates by Dr. Howard. The regular spring class in ornamental plants was offered by Dr. Wyman in Jamaica Plain, and Dr. Owen Rogers taught a class on hybridization and breeding of ornamental plants. Mr. Pride presented a course entitled "Beginning Botany for Gardeners" at Weston during the spring.

Staff members are frequently requested to speak to various organizations on the work of the Arnold Arboretum or on subjects of their research interests. A new brochure facilitates the handling of these requests. In addition, the staff participates in seminars and similar programs of other scientific organizations. Dr. Harrison, Mr. Fordham, and Mr. Williams all participated in the lecture discussions sponsored by the Massachusetts Horticultural Society during the annual spring flower show. Mr. Fordham also talked on the Members' Monday programs of that organization as well as at the Regional Meeting of the American Rhododendron Society, the Connecticut Nurserymen's Short Course, and the annual meeting of the International Plant Propagators Society. Dr. Flint spoke at the same meeting of the Plant Propagators Society and at the annual meeting of the Vermont Plantsmen's Association. Mr. Pride was on the winter program of the Worchester County Horticultural Society.

Dr. Howard was sponsored by the American Institute of Biological Sciences at the University of Maine for two talks. He appeared on the regular programs of the Pennsylvania Horticultural Society, the Barnes Arboretum, Connecticut Nurserymen's Short Course at the University of Connecticut, the Horticultural Society of New York, and gave seminar talks at the botany department of the University of Connecticut and at Clark University. He was the banquet speaker at the Clara B. Ford

Garden Forum in Michigan and the annual meeting of the American Association of Botanical Gardens and Arboreta at Hamilton, Ontario.

Dr. Wood participated in a two-day Science Seminar as part of the 125th anniversary celebration of Roanoke College in Salem, Virginia. He represented the field of biology on a panel including two chemists, a physicist and a mathematician. His talk on the subject of "Biology or Oblivion" commented on the population crisis and man's destruction of his environment.

Dr. Wyman spoke at meetings of the Garden Club Federation of Maine and the Massachusetts Garden Club Federation. He took part in the Longwood Gardens Symposium held jointly with the University of Delaware. He was on the program of the New York Botanical Garden and of the University of Georgia short course for nurserymen.

Again this year the Arboretum staff coöperated with the science teaching program in the elementary schools in Weston. The students were encouraged to study the plants and plantings of the Case Estates in Weston and to prepare competitive reports. The participants were divided into two groups: first prizes were awarded to Kenneth Leghorn and John Algird, with second and third prizes also cash awards; as honorable mention recognition, etchings were presented to each group. The prize papers concerned descriptions of the grounds, the plants or the activities there, an historical study of the Case family and the property, a special study of crab apples, one of the bristle-cone pine, and a report including a tape recording of the behavior of a family of grackles. The interest of the students and their parents resulted in larger attendance on the grounds and perhaps greater awareness and appreciation of the activities of the staff.

A special gift was received to establish an Arnold Arboretum Achievement Award for Botanical or Horticultural Excellence to be given to a student in a high school in Jamaica Plain. The award consists of a certificate, the student's selection of books of a stated value, and a gift from the Arboretum of a tree or shrub from the available duplicate plants within our nurseries. The first award was made to George B. Ransom, a senior in the Agricultural Department at the Jamaica Plain High School.

The Arboretum donated 10 units of plant material for the annual auction held by Channel 2, WGBH, Boston's educational television channel, to raise unrestricted funds for the station. Most of the plants offered for auction were unavailable through commercial sources and had been introduced and grown by the Arboretum. All plants drew bids in excess of the approximate commercial cost of such material. The commentators who offered the plants to the wide New England audience did justice to the Arboretum in their comments.

The staff coöperated with the Worcester County Horticultural Society and the Weston Garden Club in preparing and presenting two displays at the fall and spring flower shows of each organization. A display of mulch materials and berried or fruiting plants was prepared for Worcester, and

an exhibit of methods of plant propagation and a collection of edible and poisonous wild plants of New England were offered at the Weston shows.

Travel and Exploration:

Members of the staff traveled less than usual during the year, although one trip was of extended duration. Dr. Hu spent four months in Hong Kong and offered lectures in plant taxonomy at Chung Chi College. She collected where possible in the territory from the coastal mangrove area at Tai Po Kau to the mountain vegetation at Ma An Shan. Dr. Nevling and Dr. Schubert made independent trips to Mexico, the former in association with the American Institute of Biological Sciences meetings in Texas and in coöperation with the University of Mexico. Mr. Pride visited Morocco, obtaining photographs of the vegetation, as well as seeds and specimens, and continued his trip to Teneriffe, Madeira, and "Les Cèdres" at Cap Ferrat, France. He visited gardens and established contacts for the Arboretum in each area. We are grateful for the many kindnesses and the hospitality extended to him during this trip by so many people, particularly Dr. Andres García Cabezon, Director, Jardín de Aclimatación de la Orotava; Mr. and Mrs. P. Graham Blandy; and Mr. and Mrs. Julien Marnier-Lapostolle.

The field study of the dwarfed mountain top forest in Puerto Rico enabled many staff members to take part for short periods of time and to learn of the tropical vegetation in the process or continue their own studies of taxa represented in that flora. Misses Powell and Sutton and Messrs. DeWolf, Nevling, Wyman, and Howard participated. Drs. Howard and Nevling visited a comparable site on the island of St. Kitts, where studies were made with the permission of the governor, Sir Fred Philipps, and the coöperation of Mr. Campbell Evelyn. En route from St. Kitts to Puerto Rico, they spent a short time on St. Thomas for observations on the dryland vegetation.

Dr. Flint visited research stations in Minnesota, North Dakota, and Manitoba in connection with his studies of plant hardiness.

The Arboretum has also been able to support the work of other botanists collecting in areas of particular interest to the staff or of value to our collections. The field work of Dr. L. Bernardi, of the Conservatoire Botanique, Geneva, Switzerland, extended from Madagascar through Malaysia and to New Caledonia where he is making botanical collections to be shared with us. More recently, the threat of the complete destruction of the vegetation on the inadequately known island of Anegada in the West Indies was called to our attention. A special gift permitted support of collecting in this area with the specimens to be identified and distributed by the Arboretum staff. As a comparable example, Dr. Wood collected material of *Drosera* in a unique bog on the Gaspé Peninsula in August, 1967. The bog has since been destroyed but the plants now growing in the Arboretum greenhouses represent at least three species, one of which appears to have originated by hybridization of the other two followed by chromosomal doubling. There are also back-cross hybrids with both

parental species. Regrettably the botanist cannot act with sufficient speed and interest to stay ahead of the world wide destruction of essentially scientifically unknown plant material.

Gifts and Grants:

The many friends of the Arboretum renewed their support during the year with most gifts being without restrictions for use in the general work of the Arboretum. We were pleased to accept memorial gifts in honor of Mrs. John S. Ames and Mrs. Alice Hoagland and several gifts specified for the care of the *bonsai* and/or the genetic dwarf conifers.

Many persons have been generous in donating special plant materials, and we particularly value the collection of *Rosa* species and ecotypic material of *Rosa wichuraiana* from Mr. Seizo Suzuki and of *Rhododendron* and *Ilex* selections from Mr. Josiah K. Lilly, III.

A display case in the entrance hall of the Arnold Arboretum holds a collection of indian artifacts gathered from the grounds of the Arnold Arboretum by the late Ernest J. Palmer and by Alfred Fordham. Mr. Palmer bequeathed the collection to Mr. Fordham who has now officially given the display to the Arboretum. We are grateful for these evidences of former use of the land occupied by our collections.

Through the kindness of Dr. George T. Jones, of Oberlin College, the Arboretum received residual materials from the estate of Franklin P. Metcalfe, formerly of our staff. These included field books and numerical listings of his and other collections from China, as well as a smaller number of books of unusual historical interest.

Publications:

Dr. Bernice Schubert continued to edit the *Journal of the Arnold Arboretum* during the past year when four numbers, totalling 675 pages and including 20 articles, were issued. Dr. Harrison Flint served as editor of *Arnoldia*, which comprised 9 issues, totalling 91 pages.

The early volumes of the *Journal of the Arnold Arboretum* have long been out of print, as have several numbers of more recent dates. The Kraus Reprint Company, of New York, has been authorized to reproduce back issues and now volumes 1 to 20 of the *Journal of the Arnold Arboretum* are available in the reprint edition and volumes 21–40 are being prepared for reprinting.

Mercer Fellows:

The appointment of Mercer Fellows to the staff of the Arnold Arboretum was begun in 1961 following Mrs. Martha Dana Mercer's bequest to the Arboretum. Individuals are selected from candidates who request consideration for support of their program of work or study of the Arboretum collections or with the staff. As the awards have been made in the past no academic credit is given, but Fellows may audit Harvard classes with permission of the particular instructor and have full access to libraries, collections, and receive other benefits. Recipients have been

at all academic levels, from those without college background to post-doctoral scholars and those on sabbatical leaves from their home institutions. Mercer Fellowships have been awarded to scholars from Argentina, Belgium, England, Finland, Jamaica, Mexico, the Philippines, South Africa, and the United States.

The largest number of short term appointments to date was made during 1967–1968. Recipients of Mercer Fellowships for all or part of the past year and their fields of interest are indicated below.

ARTHUR CHARLES GIBSON, Miami University (Systematic botany).
MAXINE GLICKMAN, Stockbridge School, University of Massachusetts (Horticulture).
DAVID W. HALL, University of Florida (Systematic botany).
SISTER MARY VICTORIA HAYDEN, Catherine Spalding College (Systematic botany).
SYED MOHAMMED ANWARD KAZMI, Peshawar University, Pakistan (Systematic botany).
ROBERT WILLIAM LONG, University of South Florida (Systematic botany and floristics).
JOHN O'CONNOR, Wolverhampton, Technical Teachers College, England (Plant propagation).
FREDERICK E. ROBERTS, University of Connecticut (Horticulture).
OWEN MAURICE ROGERS, University of New Hampshire (Cytology and cytogenetics).
ARLON LEE SLAGH, Michigan State University (Horticulture).
JOHN WILLIAM THIERET, University of Southwestern Louisiana (Systematic botany).

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RICHARD A. HOWARD, *Director*

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Staff of the Arnold Arboretum
1967–1968

RICHARD ALDEN HOWARD, Ph.D., Arnold Professor of Botany, Professor of Dendrology, and Director.

KARL SAX, S.D., Professor of Botany, *Emeritus*.

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SHIU-YING HU, Ph.D., Botanist.
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† Died June 15, 1968.
* Appointed jointly with the Gray Herbarium.
** Retired June 30, 1968.